Instructions - Parts List

Power-Star™

308391J

EN

Used to pump high volumes of petroleum and synthetic based oils. For professional use only.

Model No. 236754, Series A

1:1 Ration Universal Pump and Reciprocator

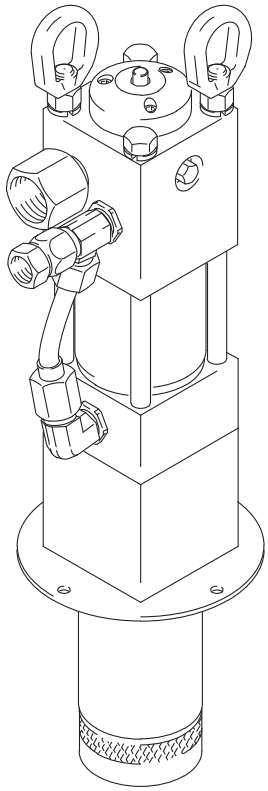
Model No. 236752, Series A

Reciprocator Only

1500 psi (10 MPa, 103 bar) Maximum Hydraulic Input Pressure
1500 psi (10 MPa, 103 bar) Maximum Fluid Outlet Pressure

Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions.

This pump is designed to be used only in pumping non-corrosive and non-abrasive oils and lubricants. Any other use of the system can cause unsafe operating conditions and result in components rupture, fire, or explosion which can cause serious injury, including fluid injection.



PROVEN QUALITY. LEADING TECHNOLOGY.

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Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

WARNING

FIRE AND EXPLOSION HAZARD

When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources, such as cigarettes and portable electric lamps.
- Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.
- Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.
- Ground all equipment in the work area.
- Use only grounded hoses.
- **Stop operation immediately** if static sparking occurs or you feel a shock**.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

SKIN INJECTION HAZARD

High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Do not point dispensing device at anyone or at any part of the body.
- Do not put your hand over the fluid outlet.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

WARNING

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read MSDSs to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
- Always wear chemically impermeable gloves when spraying, dispensing, or cleaning equipment.

MOVING PARTS HAZARD

Moving parts can pinch, cut or amputate fingers and other body parts.

- Keep clear of moving parts.
- Do not operate equipment with protective guards or covers removed.
- Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the **Pressure Relief Procedure** and disconnect all power sources.

PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer

Installation

Maximum Working Pressure of Accessories
To reduce the risk of serious injury including fluid injection and splashing in the eyes or on the skin, which may be caused by component ruptures, all accessories added to the reciprocator power supply side of the pump fluid outlet side must have at least a 1500 psi (10 MPa, 103 bar) maximum working pressure.

Pump Accessories

Suction Tube Kit: A suction tube kit is available for siphoning from 55 gallon containers.

Intake Tube: To install, apply PTFE tape to the female threads at the top of the tube (Q). Screw the tube tightly into the intake housing of the stubby pump.

Low-Level Cutoff Valve: To install, screw the low-level cutoff valve into the bottom of the pump intake tube or the suction tube. This valve closes the pump intake when the fluid level is low, causing the pump to stall to avoid running all day.

NOTICE

A pump outlet drain valve is required in the system. This valve helps relieve pressure in the displacement pump and hose when shutting down the system and in case of a clogged outlet hose. Install the valve hose close the pump outlet.

Pump Outlet Drain Valve: Install a drain valve (D) close to the pump fluid outlet assist in relieving fluid pressure in the pump, hose, and dispense valve when the pump is shut off.

Thermal Relief Kit: Install a Thermal Relief Kit (T) at the pump fluid outlet.

Grounding

The equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.

Pump: Use a ground wire and clamp. Remove the ground screw (Z) and insert through the eye of the ring terminal at end of ground wire (Y). Fasten the ground screw back onto the pump and tighten securely. Connect the other end of the ground wire to a true earth ground. (FIG. 1)

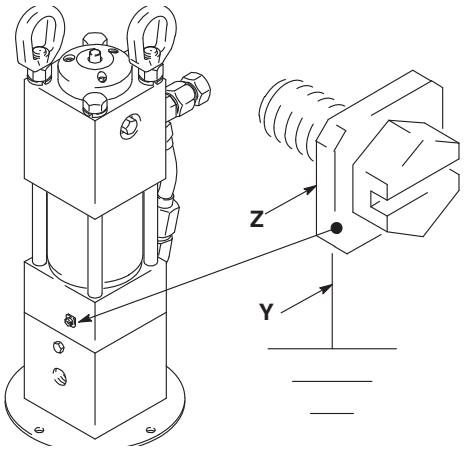


FIG. 1

Hydraulic and fluid hoses: Use only electrically conductive hoses.

Hydraulic power supply: Follow manufacturer's recommendations.

Any pails used when flushing: Use only metal, grounded pails when flushing. Make firm metal-to-metal contact between the metal part of the dispense valve and the pail. Use the lowest possible pressure.

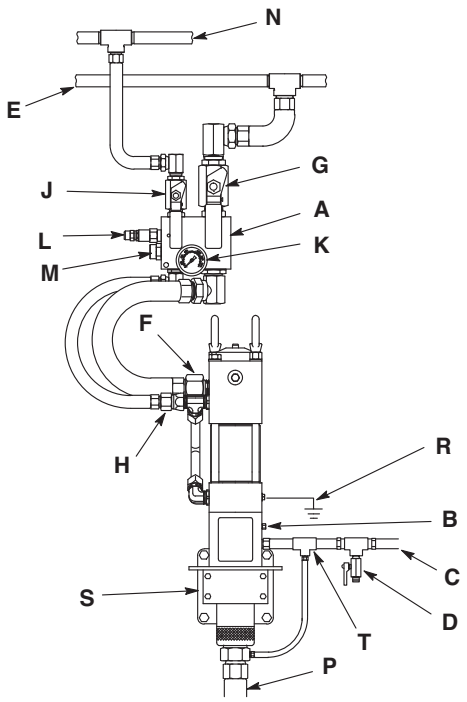


FIG. 2: Typical Installation

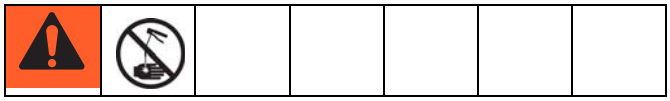
Key:

A Hydraulic Control (See manual 308395)
B Porous Plug (weep tube optional)
C Fluid Dispense Outlet
D Drain Valve (required)
E Hydraulic Return Line
F Hydraulic Outlet, 1 1/4 npt
G Return Line Shutoff Valve
H Hydraulic Inlet, 3/4 npt
J Hydraulic Supply Line Shutoff Valve
K Pressure Gauge
L Pressure Reducing Valve
M Flow Control Valve
N Hydraulic Supply Line (Use only Graco Hydraulic power supply)
P Dispensed Material Supply Suction Hose Kit
R Ground Wire (required)
S Wall Mounting Bracket (See manual 308394)
T Thermal Relief Kit (required)

NOTE: The installation shown in FIG. 2 is only a guide. For assistance in designing a system to suit your needs. Contact your Graco representative.

Mount the pump to suit the type of installation planned.

Hydraulic Power Supply



To reduce the risk of damaging the hydraulic power supply, blow out all hydraulic lines with air, flush thoroughly with solvent, and then blow out with air again before connecting the lines to the motor.

Always plug the hydraulic inlets, outlets, and lines when disconnecting them to avoid introducing dirt and other contaminants to the system.

Carefully follow the manufacturers recommendations on reservoir and filter cleaning, and periodic changes of the hydraulic fluid.

Hydraulic Components

Always turn off the hydraulic supply side valve (K) first to avoid possible serious injury or component damage. See the Typical Installation on page 6.

Drain Line: Remove the plug (24) from the pump adapter, and install a 1/8 inch diameter weep tube, ending in a waste container. Monitor the weepage of hydraulic fluid. If it seems excessive or increases suddenly, the reciprocator or pump throat seals may need to be changed. (FIG. 3)

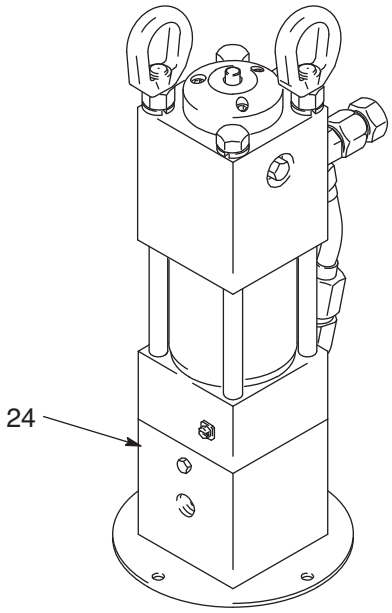


FIG. 3

Hydraulic Fluid Control: The hydraulic fluid control provides pressure regulator, and pump isolation. (FIG. 2)

Pressure Regulation: The hydraulic fluid control reduces the hydraulic oil pressure to the operating pressure required for the application.

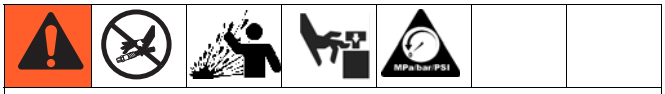
Flow Regulation: The hydraulic fluid control limits the maximum amount of oil flow to the motor to keep the hydraulic motor within the cycle rate limit. This prevents pump runaway. The limit on the Power-Star is 66 cpm.

Pump Isolation: The hydraulic fluid control has ball valves on the supply and return sides of the manifold. The ball valves isolate the hydraulic fluid control and pump for servicing without stopping the hydraulic power supply.

Operation

Pressure Relief Procedure

Follow the Pressure Relief Procedure whenever you see this symbol.

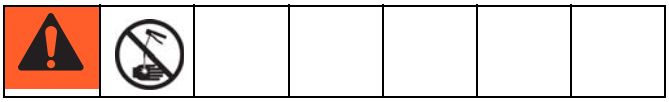


This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

1. Close the supply line shutoff valve, and then the return line shutoff valve.
2. Open the dispensing valve to relieve the pressure.
3. Place a container under the drain valve to catch any drainage. Open the pump outlet drain valve.
4. Leave the drain valve open until you are ready to dispense again.

NOTE: *If you suspect that the dispensing valve, extension, or grease fitting coupler is clogged, or that the pressure has not been fully relieved after following the steps above,* **VERY SLOWLY** loosen the coupler or hose end coupling and relieve pressure gradually, then loosen completely and clear the clog.

Before Starting the Pump



Recommended Hydraulic Oil

Use a Graco-approved Hydraulic Oil or a premium, ISO grade 46 petroleum-based hydraulic oil containing rust and oxidation inhibitors and anti-wear agents.

Before using any other type of oil in this motor contact your Graco distributor. Unauthorized use of lesser grad oil or substitutes may void the warranty.

1. Check the hydraulic fluid level in the hydraulic power supply before each use, and add fluid as necessary to fill the lines.
2. Flush the pump before using it for the first time to remove the light oil that was left in after factory testing to protect the pump from corrosion. Be sure the solvent used is compatible with the fluid to be pumped and the pump's wetted parts. See Technical Data, page 18. Flush until clean solvent comes from the outlet hose.

To Start the Pump

1. Turn on the hydraulic power supply.
2. Open the return line shutoff valve (H) first, and slowly open the hydraulic supply line shutoff valve (K). (FIG. 2)
3. Adjust the hydraulic inlet pressure from 500 to 1500 psi (3.5 to 10.3 MPa, 35 to 103 bar) with the regulator control adjustment (M) on the hydraulic fluid control (A). Increasing the inlet pressure increases the outlet pressure. Decreasing the inlet pressure decreases the outlet pressure.
4. Always use the lowest pressure possible to obtain the desired results. This reduces pump wear.

5. Never allow a pump to run dry of the fluid being pumped. A dry pump quickly speeds up and can damage itself. If it speeds up, shut off the power supply to the reciprocator immediately. Refill the supply container and prime the pump to eliminate air.

NOTE: To prevent the pump from running dry, use a low-level cutoff valve.

Shutdown and Care

At the end of the work shift or when the pump is unattended, always relieve the pressure, see Pressure Relief Procedure on page 8.

Emergency Stop Procedure

Close the supply line shutoff valve marked STOP.

Troubleshooting

1. Follow **Pressure Relief Procedure**, page 8, before checking or repairing gun.
2. Check all possible problems and causes before disassembling gun.

Problem	Cause	Solution
Pump will not run	Closed dispense valve	Pump only runs with valve open.
	Pressure too low	Increase supply pressure using the pressure adjusting valve.
	Insufficient hydraulic fluid supply	Check hydraulic power supply. Adjust to a maximum of 12 gpm (45.4 lpm) flow
	Clogged fluid outlet line, intake valve, dispense valve, suction line	Check; clear obstructions.
	Motor stalled	Press reciprocator reset button (39). Pump should start immediately. See Parts Drawing on page 16.
	Reciprocator damaged	Repair. See pages 11 through 15.
Pump speeds up or runs erratically	Pump piston and/or intake valve worn	Check and repair. See Page 11
	Empty supply container	Refill and reprime. Do not allow pump to run dry. Monitor closely or use a low-level cutoff valve.
Pump runs, but output low on up and/or down strokes	Pump piston and/or intake valve worn	Check and repair. See Page 11.
	Insufficient material fluid supply	Refill fluid supply container.
	Pressure too low	Increase supply pressure using the pressure adjustment on the control.
	Clogged fluid outlet line, intake valve, dispense valve, suction line	Check; clear obstructions.
Excessive weepage from porous plug (B)	Worn throat seals	Repair. See page 11
Hydraulic oil leaks from seal nuts in the upper housing or cap (36, 43)	Seal nuts (19) are loose, worn, or damaged	Tighten the seal nuts. If leaking persists, change the seal nuts.
Pump runs slowly with dispense valve closed	Pump/dispense line leakage	If system is OK, rebuild the pump. Use kits 220457 and 236862.

Repair

Refer to Parts Drawing on page 15 unless otherwise specified.

NOTE:

- Spool valve Repair Kit 220457 is available to replace the gaskets (29), spring retaining plugs (31), springs (21), spool (38), trip rod (33) and piston stop (37). The spool, plugs, and springs must be replaced as a group.
- Clean all parts as you disassemble them, and inspect for wear or damage. Replace parts as necessary. Use Loctite® TL-242 thread sealant, or equivalent, when thread sealant is specified.
- Pump Repair Kit 236862 is available to replace the gasket (29), o-rings (11, 12, 105 and 108) seals (17), packing (107), and piston rings (15).

Disassembly

Refer to Parts Drawing on page 15 unless otherwise specified.

To avoid serious injury, do not move this unit without the use of lifting equipment. Keep the hoist attached for steps 1 through 15.

1. Relieve the pressure (page 8), and stop the pump at the bottom of its stroke.

NOTICE

Avoid getting dust or dirt in the motor during repair. Cleanliness is essential when repairing a hydraulic motor.

2. Disconnect the displacement pump hoses. Disconnect the hydraulic hoses and plug all hydraulic connections and lines to prevent contamination.
3. Place the hydraulic motor horizontally in a bench vise at the pump adapter (42) and bottom cylinder cap (43).
4. Remove the displacement pump with a strap wrench.
5. Remove the cap screws (25) and the mounting plate (46).
6. Remove the hydraulic motor from the vise.
7. Place the piston (110) flats in the vise.
8. Loosen, but do not remove the piston rod (44) with a wrench.
9. Remove the piston (110) flats from the vise.
10. Place the motor vertically in the vise at the pump adapter (42) and the bottom cylinder cap (43).
11. Remove the piston (110), ball (103), and seal (107).

NOTICE

To prevent damage to the spool (38) and the upper housing (36), remove the detent parts (31, 21, 29, 30, and 7) before removing the end cap (40).

NOTE: The socket screw (9), cap screws (22), and retainer (32) are fastened with Loctite® TL-242. Heat may be used sparingly to soften the adhesive during disassembly.

12. Remove one detent assembly retaining plug (31), spring (21), gasket (29), ball guide (30), and ball (7). If the ball or other parts stick in the upper housing (36), use a magnet to extract the parts. Do not allow the parts to fall into the motor. Repeat the procedure for the other detent assembly.
13. Unscrew the top and bottom flare nuts on the hydraulic tube (49), and remove the tube. Allow the oil to drain from the motor into a pan.
14. Remove the socket screws (9), and remove the end cap (40).
15. Remove the bolts (23), but do not remove the rods (47).

NOTICE

With the bolts removed, the assembly may separate at the joints between the cylinder (35) and the upper housing (36) and bottom cylinder cap (43),

16. Remove the stop plug (39) from the upper housing (36). Pull the upper housing about 3 inches off the cylinder (35). Shim the housing with 3/4 in. flat stock to keep an opening. The cylinder can stay in the lower housing (43).

17. Hold the trip rod (33) steady with a trip rod pliers (P/N 207579) on the rod, and remove the top hex nut (16) from the trip rod.

18. Remove the upper housing (36). Remove the valve spool (38) from the upper housing (36). Save the spring collars (41), the springs (34), and the parts remaining inside the upper housing.

19. Inspect the bore in the upper housing (36) and the outside diameter of the valve spool (38) for wear. Replace parts if damaged. Inspect the trip rod (33) above the shoulder for damage. There must be no reduction in diameter.

20. Pull the trip rod and piston rod (44) from the lower housing (43) and cylinder (35).

21. The seals (17) must be replaced if they are leaking. Remove seals from adapter (42).

22. Perform steps 23 and 24 if parts inspected in step 19 are damaged.

23. Place the piston rod (44) in a vise; tighten the vise on the flats of the piston rod. Use a spanner wrench to remove the retainer (32). Remove the trip rod (33) from the piston rod (44).

24. Remove the trip rod nut (10) and piston stop (37). If the piston rod is replaced, remove the compression springs (18), and compression rings (15) to use the new piston rod.

Reassembly

Refer to FIG. 4 for the following instructions.

1. Place the pump adapter (42) in a vise. Grease the new seal (17) from the repair kit. Install a seal in the pump adapter (42) with the lip facings down. Install the rod guide (45) and install the second seal with the lip facing up in the pump adapter. Install the bottom cylinder cap (43). Ensure all fluid ports are facing the same direction.

2. Install the piston rod (44) into the pump adapter (42) and the bottom cylinder cap (43). Lubricate the piston rings (15) and install the piston rod (44) with the openings on the rings opposed 180°.

3. Only perform steps 4 and 5 if steps 23 and 24 of Disassembly were performed.

4. Install the compression spring (18) inside the piston rod. Install the trip rod nut (10) and piston stop (37) on the trip rod (33).

5. Install the trip rod (33) in the piston rod (44). Apply thread sealant to the retainer (32). With the piston flat in a vise, tighten the retainer until it is flush or below the piston surface. This is important to prevent the retainer from backing out during operation and damaging the motor.

6. Install the o-ring (12) on cylinder (35). Install the cylinder over the piston and rings.

7. Install the upper housing (36). Install a 3/4 inch flat stock shim between the upper housing and the cylinder. Install the trip rod guide (41), the spring (34), valve spool (38), and the remaining parts from the inside of the upper housing. See Parts Drawing, page 15,

8. Holding the trip rod (33) steady with a trip rod pliers on the rod, and install the top hex nut (16) on the trip rod.

9. Replace the o-ring (11) on the stop plug (39). Install the stop plug in the upper housing (36).

10. Install tie rods (47) and bolts (23); hand tighten.

11. Install the two lock nuts (5) and washers (6).

12. Apply thread sealant to the socket screws (9). Install the end cap (40) with the socket screws.

NOTICE

To avoid damaging the internal parts, install detent parts (31, 21, 29, 30, and 7) after install the end cap (40).

13. Install one detent assembly; retaining plug (31), spring (21), gasket (29), ball guide (30), and ball (7). Repeat for the other detent assembly.

14. Align the tie rods (47) and bolts (23) and torque to 70 to 80 ft-lbs (95 to 108 N.m). Install eyelet (26) Attach hoist to the eyelet.

15. Screw the top and bottom flare nuts on the hydraulic tube (49), and install the tube.

16. Place the motor horizontally in a vise at the pump adapter (42) and the bottom cylinder cap (43).

17. Apply thread sealant to the threads of the piston (110) and install the piston, ball (103), and the seal (107) with the lips facing up.

18. Remove the hydraulic motor from the vise.

19. Place the piston (110) flats in a vise.

20. Tighten the piston rod (44) with a wrench.

21. Remove the piston from the vise.

22. Place the pump horizontally in the vise.

23. Install the displacement pump with a strap wrench.

24. Remove the hydraulic motor from the bench vise.

25. Unplug all hydraulic connections and lines and connect the hydraulic hoses. Connect the displacement pump hoses.

26. Flush the displacement pump if possible. Relieve the pressure (page 8)

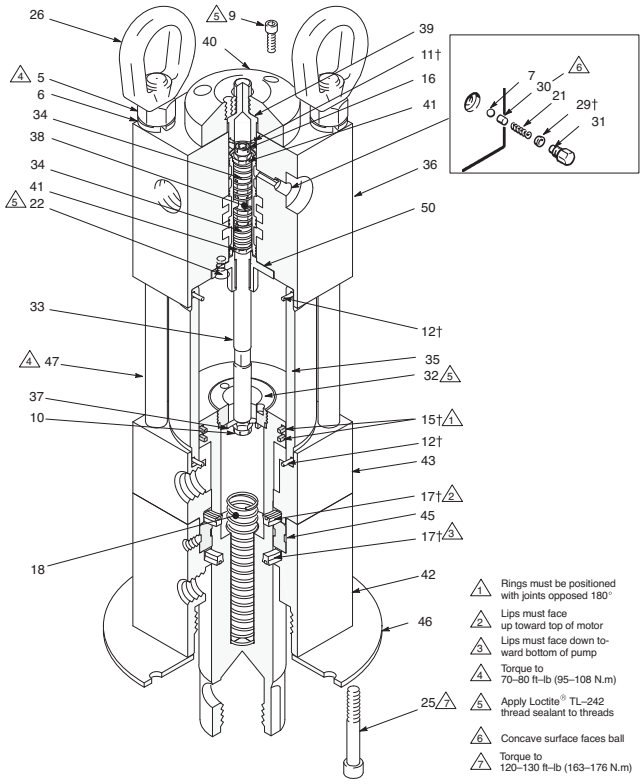
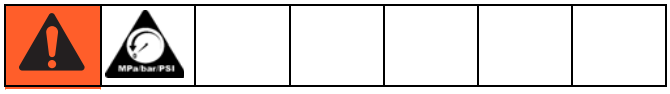


FIG. 4

Intake Valve

Refer to FIG. 5 for the following instructions.



1. Relieve the pressure, see page 8.

2. Unscrew the valve body (112). Remove the o-ring (105), ball (104), and retainer (113).

3. Inspect the parts for wear or damage. If the ball is nicked, replace it. Reassemble, using grease on the male threads.

Displacement Pump

Refer to FIG. 5 for the following instructions.

NOTE: Clean and inspect all parts for wear of damage as you disassemble them. Replace parts as needed. For the best results, always replace all the o-rings and packings when you disassemble the pump.

1. Relieve the pressure, see page 8.
2. Remove the piston (110). Follow steps 1 through 11 of Disassembly (page 11).
3. Carefully inspect the smooth inner surface of the cylinder (111) for scoring or irregular surfaces. Such damage causes premature seal wear and leaking. Replace the parts as needed.
4. Grease the new piston seal and install with the lips facing up.
5. Reconnect the reciprocator and displacement pump as described in steps 16 through 26 of Reassembly, page 12.

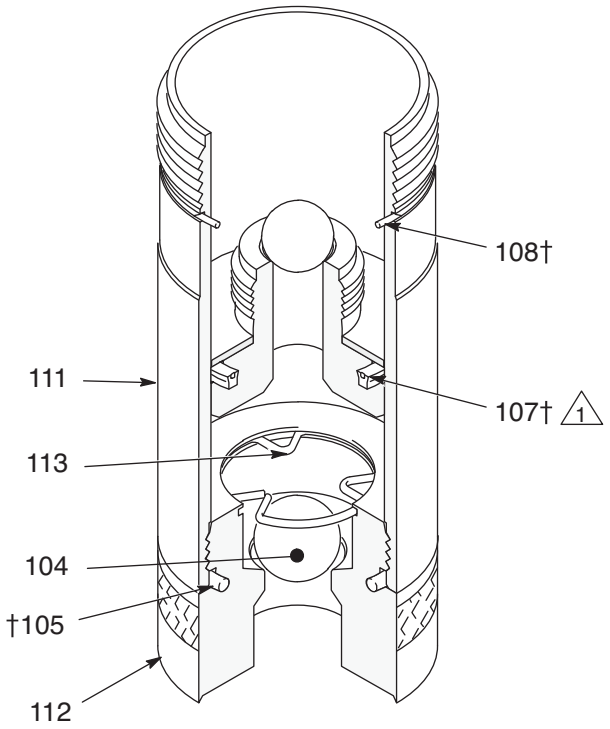
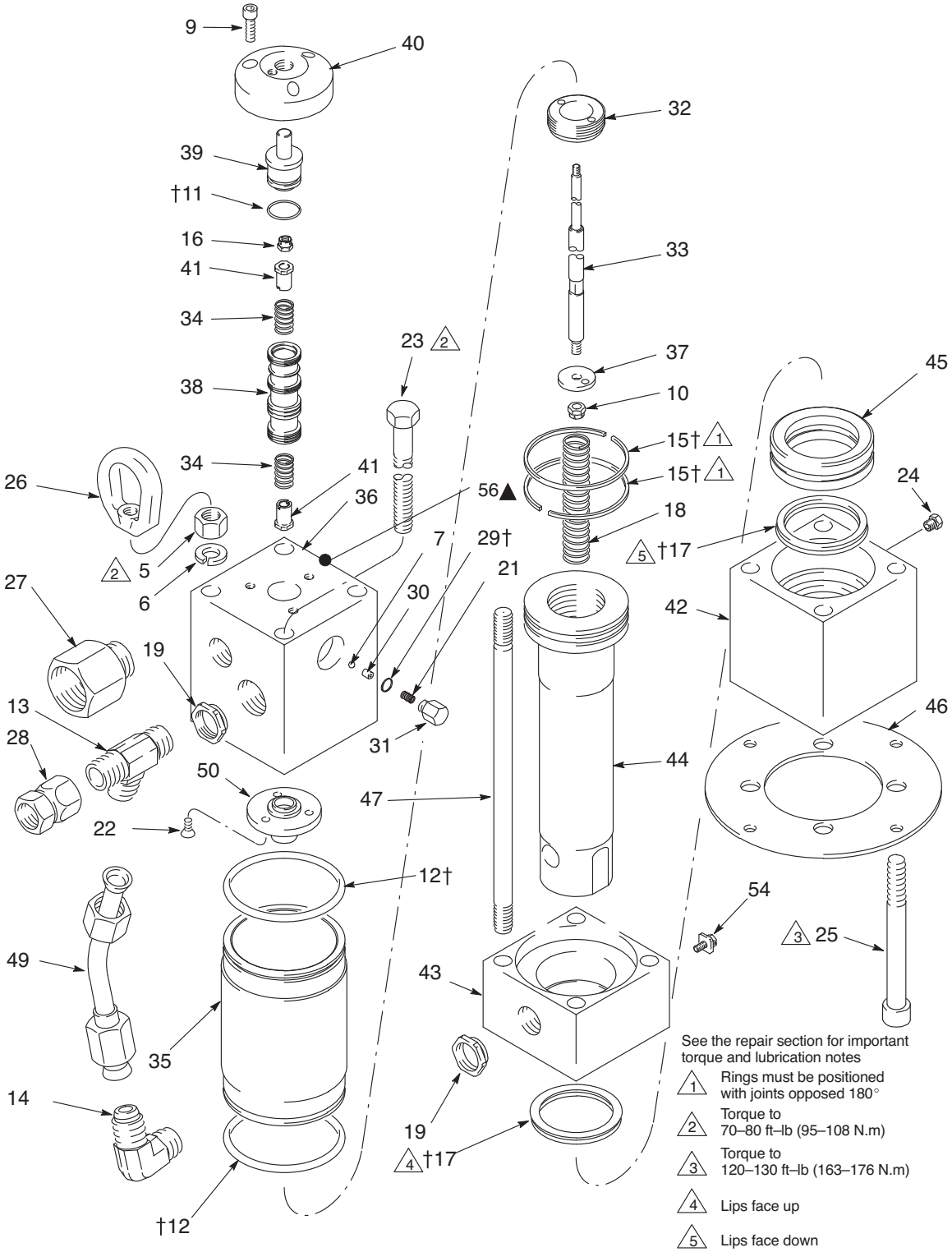


FIG. 5

Parts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3 25
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4 †17
See the repair section for important torque and lubrication notes
1 Rings must be positioned with joints opposed 180°
2 Torque to 70–80 ft–lb (95–108 N.m)
3 Torque to 120–130 ft–lb (163–176 N.m)
4 Lips face up
5 Lips face down

Part No./Description

Ref.	Part	Description	Qty.
5	100127	NUT, mscr, hex, 5/8-11 unc-2B	2
6	100128	LOCKWASHER, spring, 5/8”	4
7	101701	BALL, 1/4 inch dia	2
8	101754	PLUG, pipe, 3/8 npt(f)	1
9	101864	CAPSCREW, soc hd, 5/16-18 x 1 inch	3
10	103450	NUT, hex, self locking, 5/16-18	1
11†	104093	O-RING, nitrile rubber	1
12†	104095	O-RING, nitrile rubber	2
13	104098	TEE, tube, for 3/4 in. (19 mm) tube	1
14	104099	ELBOW, 90°, for 3/4 in (19 mm) tube	1
15†	104103	RING, piston, compression	2
16	104105	NUT, hex lock, 1/4-20	1
17†	104203	SEAL, v-block, polyurethane	2
18	104664	SPRING, compression	1
19	105429	NUT, seal, 3/4-14 npt	2
20	105430	NUT, seal, 1 in. npt	1
21	108522	SPRING, helical compression	2
22	108538	SCREW, soc flat hd, self locking, 1/4-20 x 1/2 in.	3
23	109203	BOLT, hex hd	2
24	110064	PLUG, pipe, vented	1
25	112570	SCREW, cap, soc hd	4
26	112571	NUT, eye	2
27	112573	ADAPTER, pipe, female	1
28	112574	UNION, swivel	1
29†	150111	GASKET, plug	2
30	167210	GUIDE, ball	2
31	167431	PLUG, spring retaining	2
32	171398	RETAINER	1
33	171407	ROD, trip	1
34	171411	SPRING, compression	2
35	171412	CYLINDER	1
36	172814	HOUSING, upper	1
37	181243	STOP, piston	1
38	181874	SPOOL, valve	1
39	183252	PLUG, stop	1
40	183290	CAP, end	1
41	183659	GUIDE, trip, shaft	2
42	189714	ADAPTER, pump	1
43	189715	CAP, cylinder, bottom	1
44	189716	PISTON, rod, hydraulic	1
45	189717	GUIDE, rod	1
46	189718	PLATE, mounting	1
47	189719	ROD, tie	2
48	189720	LABEL, identification	1
49	210108	TUBE	1
50	210292	BEARING and GUIDE	1
54	116343	SCREW, ground	1
56▲	290331	LABEL, instruction, English	1

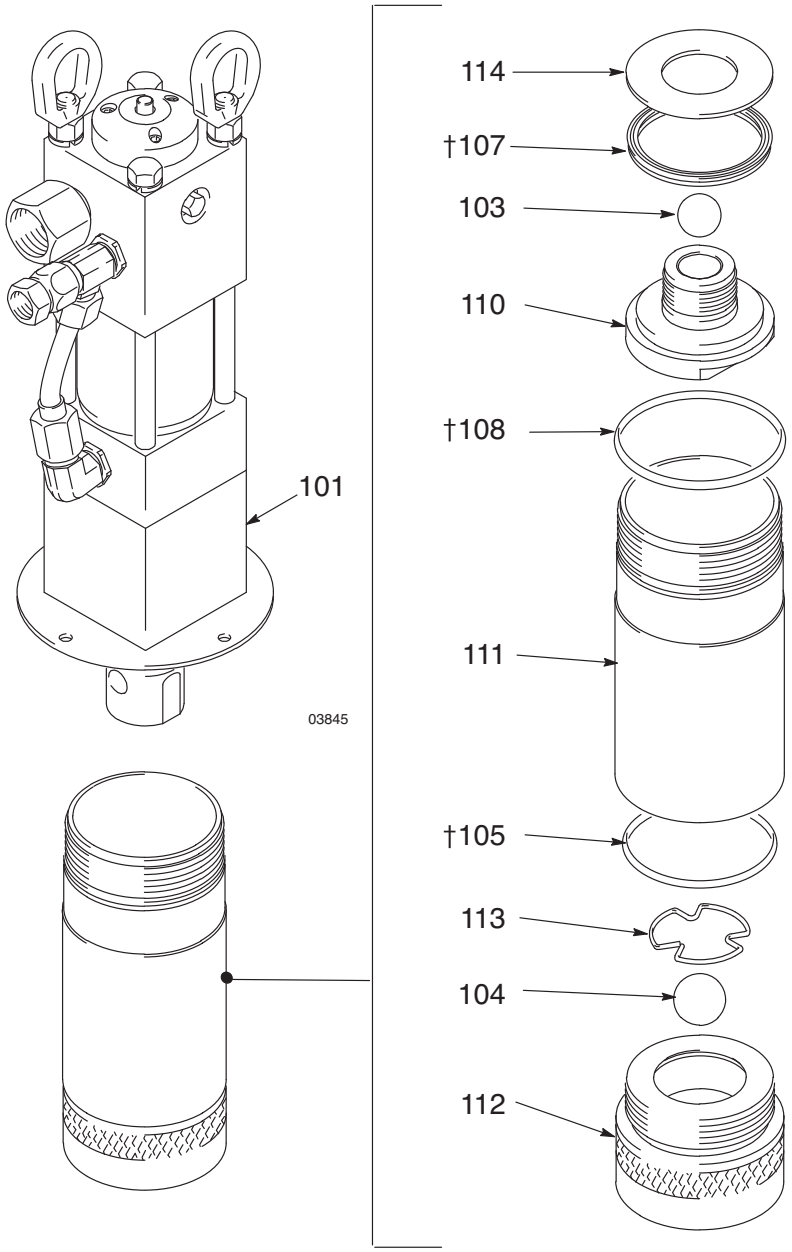
▲ *Replacement Danger and Warning labels, tags, and cards are available at no cost. Also available in the following languages:*

German (Part No. 290396)
French (Part No. 290397)
Spanish (Part No. 290398)

† *Parts included in Pump Repair Kit 236862 (purchase separately).*

Ref.	Part	Description	Qty.
101	236752	RECIPROCATOR, hydra, Power-Star	1
103	101178	BALL, metallic	1
104	108001	BALL, metallic, sst	1
105†	110828	PACKING, o-ring	1
107†	112565	SEAL, block vee	1
108†	166071	PACKING, o-ring	1
110	189707	PISTON, fluid	1
111	189708	CYLINDER, pump	1
112	189709	VALVE, housing	1
113	189710	RETAINER, ball	1
114	189711	WASHER, piston	1

† *Parts included in Pump Repair Kit 236862 (purchase separately).*



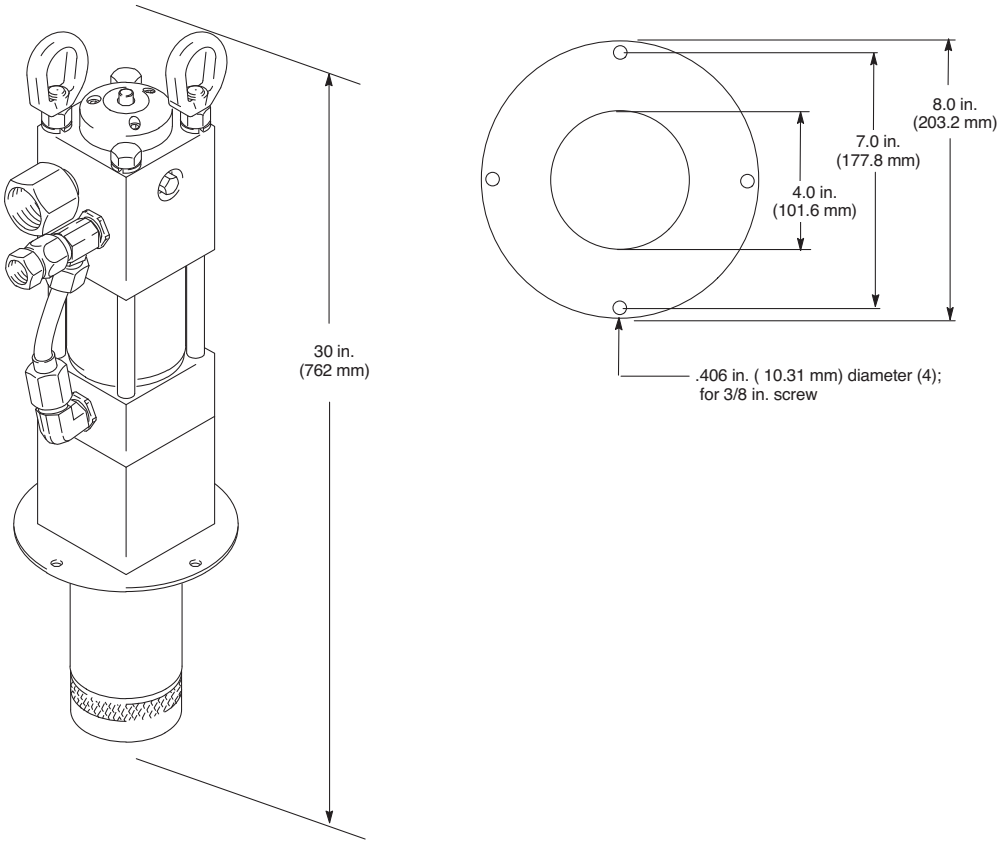
Technical Data

Power-Star™		
	US	**Metric**
Fluid Ratio	1:1	
Maximum Output Flow	12.0 gpm	45.4 lpm
Maximum Output Pressure	1500 psi	10.3 MPa, 103 bar
Maximum Input Flow	12.0 gpm	45.4 lpm
Maximum Hydraulic Fluid Input Pressure	1500 psi	10.3 MPa, 103 bar
Maximum Input Fluid Temperature	130°F	55°C
Pressure Reducing Adjustment Range	300-1500 psi	2.07 - 10.3 MPa, 20.7 - 103 bar
Weight	100lb	45.4 kg
Rod Seals	Nitrile	
Piston Seals	Polyurethane	
Displacement Pump Wetted Parts	Iron, Steel, SST Nitrile, Polyurethane	
Sound Pressure	78 dB(A)*	

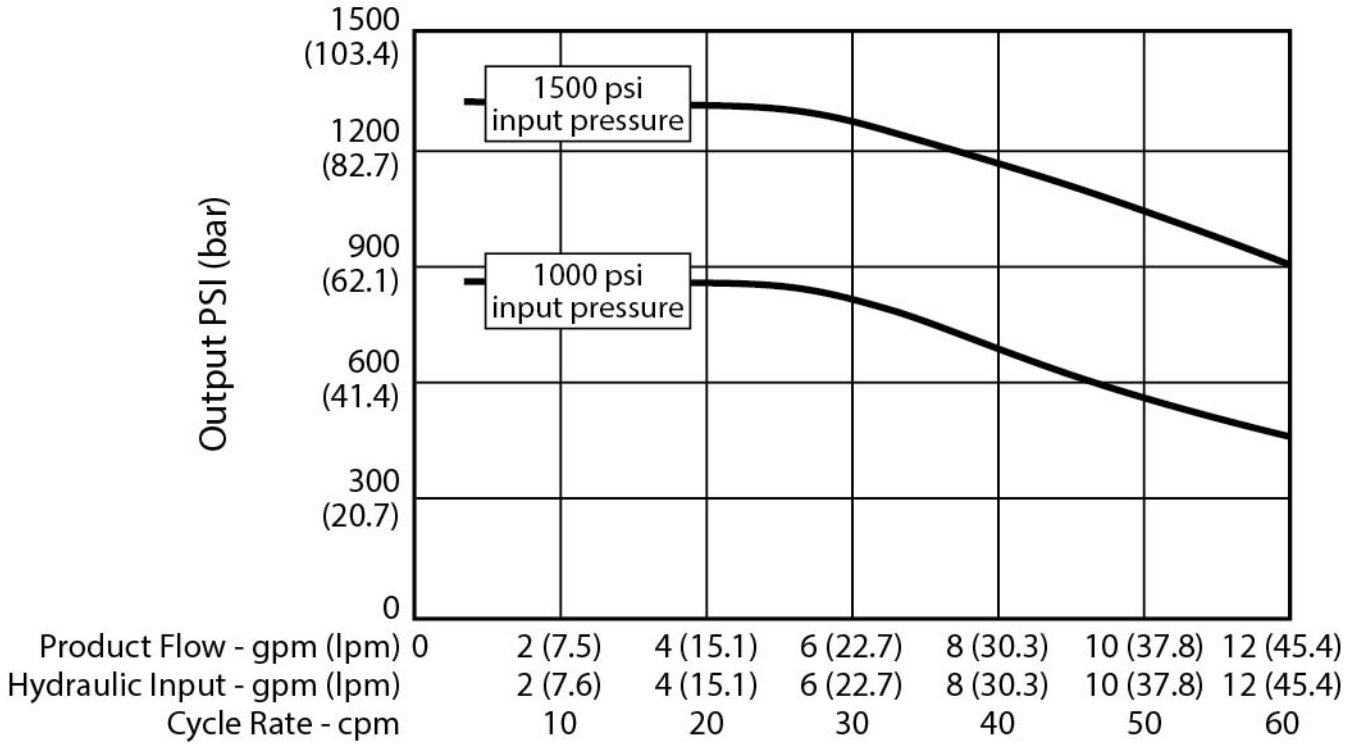
* Sound pressure reading taken with pump operating at 60 cycles per minute. Sound pressure measured per CAGI-PNEUROP, 1971

Loctite® is a registered trademark of the Loctite Corporation.

Dimensions



Performance Chart



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Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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Phone: 612-623-6928 **or Toll Free:** 1-800-533-9655, **Fax:** 612-378-3590

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Original instructions. This manual contains English. MM 308391

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